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Specifications

1. Title of the Invention

Picture and Voice Communication Equipment

2. Claim

Picture and voice communication equipment comprising a receiving means which receives picture and voice information transmitted from another party via a communication line, a means which reproduces said picture and voice information received by said receiving means into picture and voice, respectively, and a means which records said picture and voice information received by said receiving means.

3. Detailed Specifications

(Field of Industrial Application)

The present invention relates to picture and voice communication equipment, and in particular, picture and voice communication equipment for transmitting pictures and voices, and needless to say, it has functions for recording pictures and voices thus received and for retrieving externally prerecorded pictures and voices.

(Prior Art)

There have been expectations for video telephones and TV conferences as regular forms of communication to enable a conversation with a remote party while watching them.

Services with telephone functional enhancements, such as video telephone services, have been composed thus far mainly of a face-to-face calls using the head-shot displays of callers for the purpose of transmitting pictures and voices thus picked up, displaying pictures thus received, and reproducing voices.

(Problems to be Solved by the Invention)

Although conventional picture and voice communication equipment has been capable of recording a voice sent from the transmitting side when the receiving side was absent by the use of a video telephone, etc., such equipment could not record the picture sent in parallel therefrom. Due to such a limitation, communication lines connecting a plurality of picture and voice communication equipment presented a problem because a voice or picture prerecorded by certain equipment could not be reproduced by other equipment on those lines.

Thereupon, an object of the present invention is to provide picture and voice communication equipment capable of transmitting and recording picture and voice even in the absence of the receiving side and of reproducing and confirming the contents thereof from other equipment.

(Means for Solving the Problems)

The picture and voice communication equipment pertaining to the present invention is composed of a receiving means which receives picture and voice information transmitted from another party via a communication line, a means which reproduces said picture and voice information received by said receiving means into picture and voice, respectively, and a means which records said picture and voice information received by said receiving means.

(Effects)

The picture and voice communication equipment pertaining to the present invention is provided with a means for receiving transmitted picture and voice data, enabling the recording of this picture and voice data received by the receiving means, and further, it is provided with a reproducing means enabling reproduction of voice and picture data prerecorded by the recording means.

(Working Examples)

A working example of the present invention will now be described with reference to the drawings.

Fig. 1 is a block diagram depicting a functional configuration of the picture and voice communication equipment of a working example of the present invention.

The equipment in the drawing comprises a small camera 1, an A/D converter 2 for transmitting data for transmission, picture memory 3 for transmitting picture data, and a D/A converter 5 for transmitting picture data. It further comprises an A/D converter 5 for receiving picture data, picture memory 6 for temporarily storing received picture data, voice memory 7 for temporarily storing received voice data, a control unit 8 for controlling and monitoring the equipment itself, a D/A converter 9 for display use for displaying received picture data, a monitor 10 and an external monitor 15 for displaying a picture, a control unit 11 for operating the equipment externally, an external camera 12 for capturing a transmitted picture inside the equipment from outside, an input changeover switch 13 for selectively switching between the small camera 1 and the external camera 12, a digital recorder 14 for recording picture and voice data, and a receiver 16 for connection with the digital recorder 14 that stores picture and voice data and the control unit 11. In addition, the control unit 8 comprises a central processing unit 81 (referred to as "CPU," hereinafter) which performs processing in accordance with an instruction from the control unit 11, operating memory RAM 82 for random access in the processing performed by the CPU 81, and memory ROM 83 in which each type of program, data, and the like pertaining to the processing performed by the CPU 81 is stored.

Incidentally, the small camera 1 and external camera 12 are switched by the input changeover switch 13, depending on the purpose of use thereof. In short, when one wants to transmit a portrait of the speaker, the small camera 1 is switched to and used, and when transmit a landscape of the aspects of a room or the like when no one is at home, the external camera 12 is switched to and used. Depending on the purpose of use of the monitor 10 and external monitor 15, moreover, although communication normally is done by observing the monitor 10 having a relatively small screen, the external monitor 15 having a large screen is used when a plurality of people are viewing a received image concurrently. Moreover, the external monitor 15 has a power supply independent from that of the equipment. When this power supply is turned on, a screen can be displayed on the external monitor 15 in parallel to the monitor 10.

The picture and voice transmitting/receiving processings by this device are described next. A planar image of a still picture being transmitted/received is obtained, and moreover, in transmission of voice and picture, the picture and image are transmitted alternately.

The transmission processing is described first.

A sender designates, via the control unit 11, if the picture being transmitted is to be inputted from the small camera 1 or from the external camera 12. Depending on the instruction from the control unit 11, the CPU 81 of the control unit 8 generates a switch control signal IS and outputs it to the input changeover switch 13, which selectively switches picture-fetching destination, based on the signal IS, depending if the picture is from the small camera 1 or from the external camera 12. Using the above process, the selectively switched and fetched picture data for transmission use is converted from an analog quantity to a digital quantity by the A/D converter 2 for transmission use via the input changeover switch 13, and is temporarily stored in the picture memory 3 for transmission use. The picture data stored in the picture memory 3 for transmission use also is inputted into the display D/A converter 9 for display use, where it is converted to an analog quantity again and displayed on the monitor 10 or the external monitor 15. Now the sender operates the control unit 11 and selects the picture to be sent by observing the monitor's screen. If the picture being sent is determined, an instruction for transmission is

issued via the control unit 11, and accordingly, the CPU 81 of the control unit 8 creates a memory control signal IM1, outputs it to the picture memory 3 for transmission use, this memory 3 reads the picture data to be transmitted and outputs it to the D/A converter 5 for transmission use. The D/A converter 4 thus converts the picture data to an analog quantity and sends it over a communication line.

Meanwhile, the voice is inputted by the receiver 16, modulated into a signal on a communication line by way of the A/D converter 2 for transmission use and the D/A converter 4 for transmission use by operating the control unit 11, and is transmitted over the line.

The reception operation is described next.

The picture and voice data transmitted according to the aforementioned transmission processing was inputted into the A/D converter 5 for reception use and received. Now, the A/D converter 5 for reception use converts the picture and voice data inputted through the communication line from an analog quantity to a digital quantity. The picture data is then sorted into voice memory 7 and the voice data is sorted into picture memory 6 for temporary storage, respectively. Simultaneously, the data converted by the A/D converter 5 for reception use also is inputted into the display D/A converter 9 for display use. This display D/A converter 9 then converts the picture data inputted as a digital quantity into an analog quantity so that it can be displayed on the monitor, and displays it on the monitor 10 or 15. Moreover, the voice data converted to an analog quantity in the audible region by the display D/A converter 9 for display use is sent to the recipient by the receiver 16 by way of the control unit 11. Now, the picture memory 6 and voice memory 7 perform processing in accordance with a memory control signal IM2 from the control unit 8. Memory 6 and 7 operate so as to transmit the received data stored temporarily in memory to the digital recorder 14 if the memory control signal IM2 includes the instruction details "record received data." But if the memory control signal IM2 includes the instruction details "do not record received data, memory operates so that no data is transferred to the digital recorder 14. By using the above process, processing for recording received data is performed between picture memory 6 and voice memory 7 to the digital recorder 14.

Moreover, the contents of the memory control signal IM2 are determined when the recipient discerns whether the received data needed to be recorded. In short, the recipient confirms the received data by means of the receiver or monitor, and indicates whether or not that data will be recorded via the control unit 11. Accordingly, the control unit 11 outputs the designated contents to the control unit 8 as to whether or not that data is to be recorded. The control unit 8 then generates a memory control signal IM2 matching the designated contents, and outputs it to memory 6 and 7. Transmission/reception of the picture and data by this equipment is performed as described above.

A case in which data recorded when transmitted picture and voice data are recorded by the digital recorder 14 is reproduced is described next with reference to Figs. 1 to 3. Fig. 2 is a drawing explaining the state when the equipment depicted in Fig. 1 records the picture and voice as they are received, to explain the relationship between the memory control signal IM2 and the recording operation.

Fig. 3 is a drawing explaining a state when the equipment depicted in Fig. 1 records data received in the absence of the receiving side.

A case in which the received picture and voice are recorded is explained as they are received.

As shown in Fig. 1, the data received from picture memory 6 and voice memory 7, which are temporary memory for received data, via the communication line is recorded in the digital recorder 14 based on the memory control signal IM2. This aspect is further explained with reference to Fig. 2.

"Recording switch turned ON" in Fig. 2 corresponds to an operation performed when the recipient requests recording of the received data via the control unit 11. The memory control signal IM2 shown in Fig. 1 is generated after the "recording switch turned ON" operation, and outputted to memory 6 and 7. Moreover, the sections with the wavy line in Fig. 2 designate received picture data 1 and picture data 2 and the sections with a straight line designated received voice data.

The recipient then operates the equipment so as to record the picture data 1 and 2 and voice data by performing the "recording switch ON" operation twice between the beginning and end of reception. This recording operation indicates data transfer from picture memory 6 and voice memory 7 to the digital recorder 14. When data stored temporarily in memory 6 and 7 is transferred to the digital recorder 14 according to the signal IM2, the succeeding data is stored in a form so as to overwrite the old data.

Incidentally, although the picture data 1 and picture data 2 are recorded sequentially by the digital recorder 14 of the equipment, this recorder provides a retrieval signal for specifying picture data in each piece of picture data and records it to facilitate retrieval of recorded picture data. This processing method will now be described.

If the recipient confirms the picture data 1 by means of the monitor, the picture data 1 is imparted with a retrieval signal to specify the picture data 1 and a request for providing the retrieval signal is outputted to the control unit 8 via the control unit 11. Accordingly, the control unit 8 generates the specific retrieval signal of the picture data 1 and outputs it to the digital recorder 14. Accordingly, the digital recorder 14 provides the retrieval signal in the picture data 1 inputted from picture memory 6 and records it.

The picture data 2 also is specified and recorded as with the picture data 1.

A case in which the picture and voice received in the absence of the recipient will now be described with reference to Fig. 3.

When the recipient is absent, an outgoing verbal message prepared in advance regarding that he/she is absent is sent after a few ring-back tones depending on the automatic telephone answering processing format. Something to the effect that a password number input is requested by the other party is then recorded as the contents of the verbal message regarding the message of absence. The sender then transmits a password number after the verbal message regarding a message of absence has been sent by telephone. As long as this password number matches the password number preregistered on the receiving side, recording of the picture and voice, as shown in Figure 2, can be processed. When the password numbers do not match, only a voice may be recorded.

The recipient designates an audio recording of a message of absence for the message that he/she is

absent via the control unit 11 and this recipient makes a verbal input via the receiver 16. The message of absence inputted verbally is then recorded by the digital recorder 14 by way of the A/D converter 2 for transmission use. If there is a subsequent incoming call in the absence of the recipient, the control unit 11 instructs the control unit 8 to transmit the message of absence, and accordingly, the control unit 8 reads the data of the message of absence from the digital recorder 14 and outputs it to the D/A converter 4 for transmission use. The D/A converter 4 then sends the message of absence to the originator over the communication line.

As described above, when the message of absence has been sent, the originator transmits the password number via the push-button phone or the like of the control unit 11. The receiving side receives the password number by way of the A/D converter 5 for reception use and temporarily stores it in voice memory 7. The control unit 8 then stores the password number stored in voice memory 7 in memory RAM 82 and collates it with the password number preregistered in memory RAM 82 using a program related to collating password numbers preregistered in memory ROM 83. Now, when the received password number matches the registered password number, the control unit 8 records the picture and voice as in Fig. 2. If there is no match, the control unit 8 performs control so that only the voice is recorded.

As described above, the method for recording received data varies depending on matched or unmatched password numbers; hence, effective use of memory by the digital recorder 14 can be engineered.

A situation in which received data recorded by the digital recorder 14 is reproduced is described next.

When the recorded contents are reproduced, the control unit 11 issues an instruction to reproduce these contents, and accordingly, the control unit 8 performs controls so that the received data recorded by the digital recorder 14 is outputted therefrom. Then this recorder 14 outputs the received data to the display D/A converter 9 for display use. Accordingly, control is performed by way of the control unit 11 so that the display D/A converter 9 outputs picture data to the monitor 10 or external monitor 15 and outputs the voice data from the receiver 16. Only the required information may be fetched and reproduced from the digital recorder 14 by inputting a retrieval signal imparted to designate a picture.

Fig. 4 is a flowchart for explaining the operation for processing the transmission/reception shown in Figs. 2 and 3, which is stored as a program in memory ROM 83.

The transmission/reception processing operation of the equipment is further described with reference to Fig. 4.

First of all, the equipment starts communication and calls the other party using a ring-back tone, etc. Whether the other party has spoken into the mouthpiece or not is judged in Step S50 (abbreviated "S50" in the drawing). If the other party has spoken into the mouthpiece, the processing proceeds to Step S51a, where whether the other party has finished the call or not is judged. If it has, the processing proceeds to Step S56, where the call state is cancelled, communication ends by disconnecting the line, and so forth. Meanwhile, if the call does not end and is resumed in Step S51a, the processing proceeds to Step S52a,

where whether the received data is recorded or not is judged. Whether it is recorded or not is judged according to whether the operation "recording switch ON" has occurred by means of the control unit 11. If it is judged that there is a request for recording due to the operation "recording switch ON," then the processing proceeds to Step S53a, where a retrieval signal and the received voice data and picture data are recorded on the digital recorder 14. Then the processing returns to Step S51, and the processing thereof is repeated. Meanwhile, in Step S52, if it is judged that there was no request for recording in the operation "recording switch ON," then the processing returns to Step S51a where the call state continues.

The processing operation in the absence of the other party is described next.

If the other party is absent according to the judgment made in Step S50, in Step S54, a password number is transmitted in order to set the equipment in a call-enable state. If the receiving side receives the transmitted password number, in Step S55, whether the password number matches the preregistered password number is judged. If it is judged the passwords match, the processing proceeds to Step S51c, where it is judged whether the call has ended or not. If it has, the processing terminates communication via Step S56. If it is judged in Step S51c that the call is in a state of continuation, the processing proceeds to Step S52c, where it is judged whether the received data is recorded or not. If it is, whether the operation is in a "recording switch ON" state or not is judged. If it is, the processing proceeds to Step S53c, where the voice and the retrieval signal designating that voice are recorded on the digital recorder 14, and after that, the processing returns to Step S51c where the processing thereafter is performed. Meanwhile, in Step S52c, if it is judged that it is not in the "recording switch ON" state, the processing returns to Step S51c where the processing operates to perform the processing thereafter until the call state is terminated.

Moreover, if it is judged that the password numbers match in the processing Step S55, the processing returns to Steps S51b, S52b, S53b and S56. Although this processing is done similar to that for the aforementioned non-matching password numbers, in Step S53b, the picture and voice data are recorded on the digital recorder 14 along with the retrieval symbol specifying these pieces of data.

If the aforementioned password numbers and retrieval symbols are used, retrieval and fetching of any given information recorded on an external device also becomes easy. That is, if the required information is present, the equipment is brought into a call state, and the password number is transmitted. The required information can be obtained by transmitting the retrieval signal (control signal) in accordance with the instruction sent from the other party's side. By applying this, the details of the call placed from the remote site in its absence become known. Moreover, when it is assumed that there is an information center handling information of various genres, such as airplane and Shinkansen [the "bullet train"] vacancy information, videos and concert information, and weather information for various regions, a variety of information can be obtained by connecting thereto. An outline of this communication form is depicted in Fig. 5.

Fig. 5 is a schematic drawing for describing the communication mode between an information center handling information of various genres and users thereof.

Fig. 6 is a flowchart for explaining the processing operation of the picture and voice communication

equipment using the communication mode in Fig. 5.

As shown in Fig. 5, users of the information provided by the information center can read information via a plurality of communication devices connected to the same communication line as the information center. In this communication mode, the users transmit password numbers and retrieval signals to the information center to obtain information. In response, the information center retrieves the applicable information from the storage section where a variety of information is recorded, based on the retrieval symbols, and adopts a mode for providing each type of information upon transmitting the applicable information to the users.

Another description will be added with reference to Fig. 6. In Step S60, the equipment first starts communication, is brought into a communication-possible state with the information center, and transmits the password number to the information center. In Step S61, the information center checks the password numbers. If there is no match, it terminates communication because it disapproves access to information. However, if the password numbers match, in Step S62 the user transmits the retrieval signal of the requested information. Accordingly, the information center retrieves the data applicable to the retrieval symbol and transmits this data (voice and picture) to the user. The user then receives the data from the information center. In Step S64, whether or not reception was terminated or not is judged. If the user receives all the necessary data from the information center, communication is terminated. But if further subsequent data is requested, the processing returns to Step S62, and a series of processings are performed to perform the processings thereafter.

Moreover, the processing flow in Fig. 6 is stored in memory ROM 83 as a program, and processing is performed based on control by the CPU 81.

(Advantages of the Invention)

According to the picture and voice communication equipment pertaining to this invention, there are advantages in that, since it has a recording means for recording received pictures and voice internally, in one's absence, the received pictures and voice can be recorded and reproduced. Furthermore, this equipment may have a retrieval function so as to be able to specify the data recoded by the recording means; hence, one can be made aware of important matters thus recorded remotely during one's absence, and also, data is prevented from being damaged by unauthorized read-out of the recorded data by a third party, and so forth.

4. Brief Description of the Drawings

Fig. 1 is a block diagram showing a functional configuration of the picture and voice communication equipment of a practical example of the present invention and Fig. 2 is a drawing for describing a state when the equipment shown in Fig. 1 records the picture and voice as they are received. Fig. 3 is a drawing for describing a state when the equipment shown in Fig. 1 records data received in the absence of the receiving side. Fig. 4 is a flowchart for explaining the transmission/reception processing operations shown in Figs. 2 and 3. Fig. 5 is a schematic diagram for describing a communication mode between an information center that supplies information of various genres and users thereof. Fig. 6 is a flowchart explaining the processing operation of the picture and voice communication equipment using

the communication mode depicted in Fig. 5.

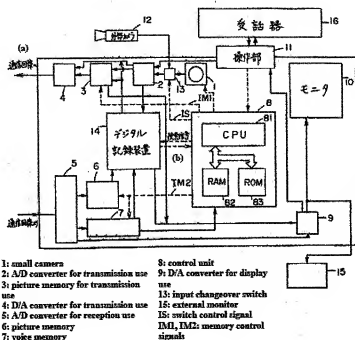
Reference symbol 3 in the drawings denotes picture memory for transmission use; 6 denotes picture memory; 7 denotes voice memory; 8 denotes a control unit; and 14 denotes a digital recorder.

Moreover, the reference symbols that are the same in each drawing denote the same or corresponding parts.

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Fig. 1



Key: (a) to communication line; (12) external camera; (16) receiver; (11) control unit; (10) monitor; (14) digital recorder; (b) retrieval signal; (c) from communication line

Fig. 2

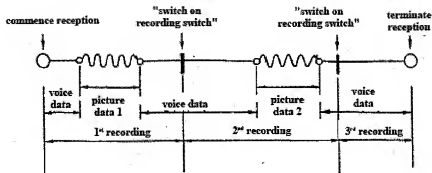


Fig. 3

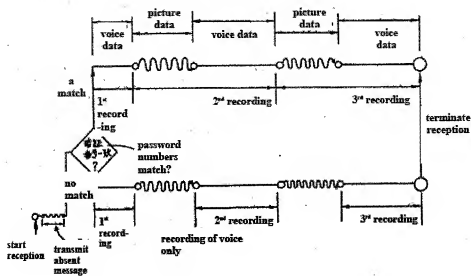
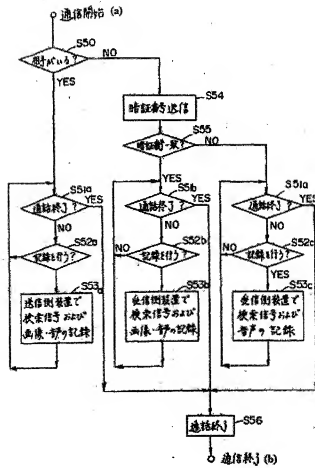
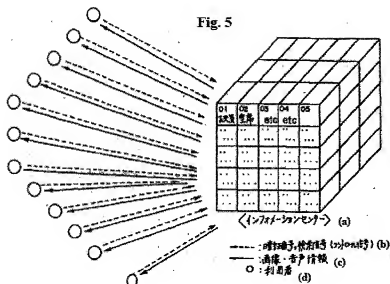


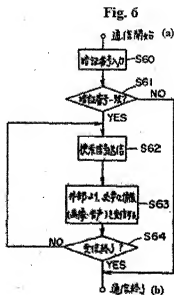
Fig. 4



Key: (a) Start of communication; (S50) Other party present?; (S54) Transmit password number; (S55) Do password numbers match?; (S51a) Has communication ended?; (S51b) Has communication ended?; (S51c) Has communication ended?; (S52a) Perform recording?; (S52b) Perform recording?; (S52c) Perform recording?; (S53a) Recorder on transmission side records retrieval signal and picture and voice; (S53b) Recorder on reception side records retrieval signal and picture and voice; (S53c) Recorder on reception side records retrieval signal and voice; (S56) End communication; (b) End of communication



Key: (01) Temperature; (02) Seating; (a) <Information Center>; (b) Password number, retrieval signal (control signal); (c) Picture/voice information; (d) User;



Key: (a) Start of communication; (S60) Input password number; (S61) Do password numbers match?; (S62) Transmit retrieval signal; (S63) Transmit necessary information (picture and voice) from outside; (S64) Has communication ended?; (b) End of communication